University of Toronto

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COMPUTER SCIENCE

NEWSLETTER

No. 84

Edited by C. A. Ford

Date January 31, 1972

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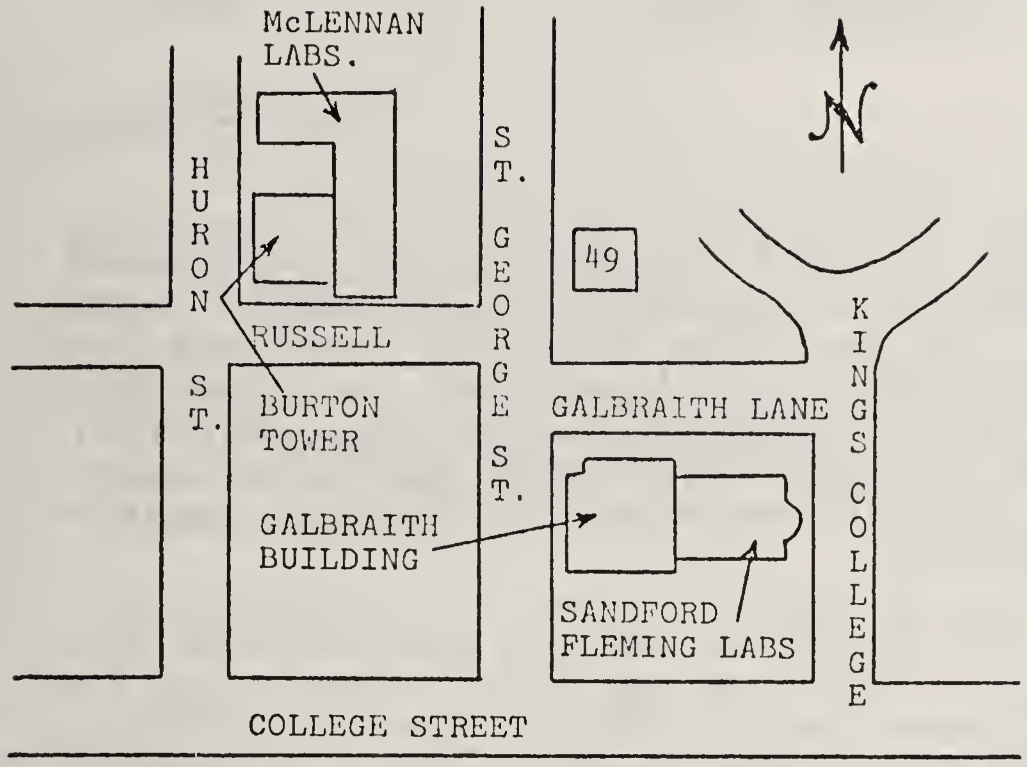
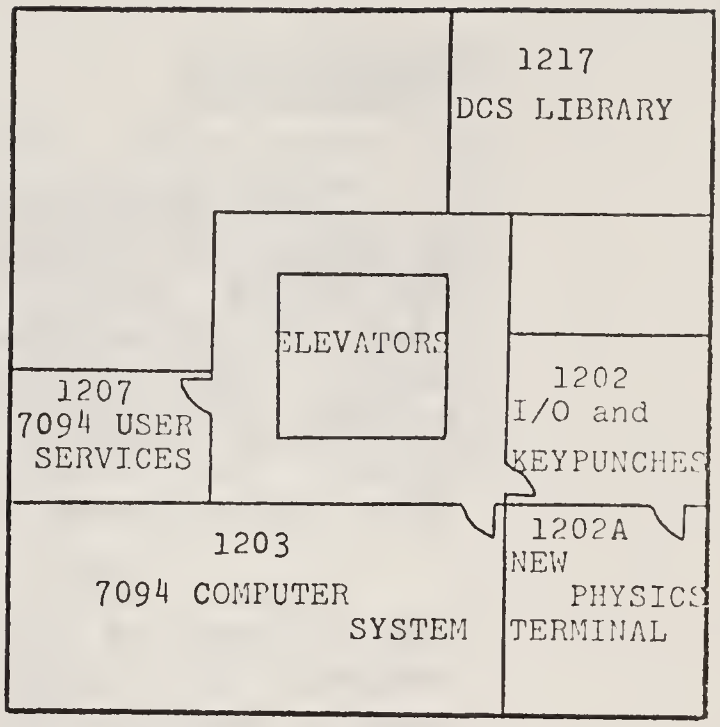
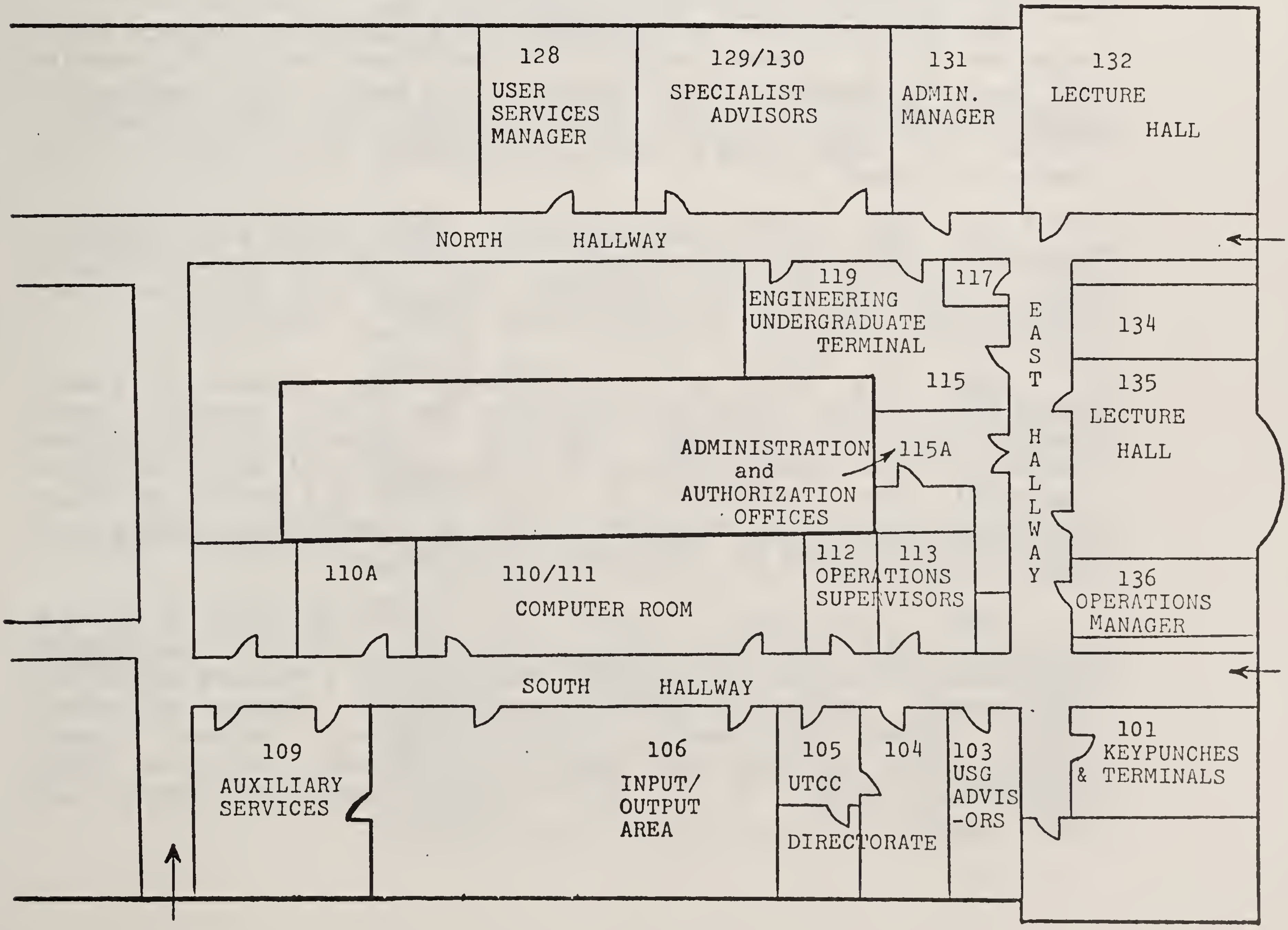




FLOOR PLAN: 12th FLOOR BURTON TOWER

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE
SANDFORD FLEMING LABORATORIES



PROJECT '72

C. A. Ford

The System/370-165 arrived in December six days ahead of schedule, allowing it to be worked up carefully into operating condition. The departing S/360-65 completed its last job on December 24th and was dismantled on December 26th. Its equipment was transferred to the new Model 165, making it ready for software checkout during Monday December 27th. The first user job was processed on Tuesday, twenty-four hours ahead of schedule.

Free, but somewhat erratic, service was provided for the balance of the week as UTCC and IBM staff worked out a variety of minor software and hardware bugs. A grafitti board question has since been asked when we would be back to 'steady state'. The hardware is now essentially stable. A schedule of software changes, many transparent to the users, exists. These items generally aim at improved performance and operational ease. Our aim is ever-improving service, realizing that the 'steady state' must be the unattainable perfection.

The new machine was formally introduced on January 3rd, with Dr. J. H. Sword, Prof. D. F. Forster, Mr. A. G. Rankin of the University and Messrs. B. Kuehn, M. Burns, J. Kranias, and R. Jull of IBM on hand for the occasion. Photos of the event are on display in the hall at the Computer Center.

The new S/370 continues to run jobs with visibly improved performance compared to its S/360 predecessor. Users are evidently receiving average CPU and core cost reductions, based on the new price list, of over 30%.

Work is also being processed at generally lower priority levels. Thus the user who now finds service good enough at the standard priority 6 pays only half-price compared with using priority 8. If priority 4 will suffice compared with priority 6, a job costs 40% less. A joint Computer Users Committee-UTCC study of comparative costs is now in the process of data reduction and analysis.

Many individuals within the Computer Centre, on the Physical Plant staff, and on contractors' staffs performed extremely effectively during this project, making possible its unusual history of early completions. These efforts, which helped our users survive upheaval during a peak period, have been greatly appreciated by users and the UTCC management team. So .... back to the humdrum of making the S/370 hum.

SUGGESTIONS

Janet Marsh

The number of suggestions received this month has dropped considerably, possibly reflecting the increased use of the grafitti boards. The thirty-one suggestions received are broken down into the following general categories: technical issues (5), Computer Centre policies (1), equipment and Physical Plant ideas (10), advising services (2), general job handling procedures (6), publications (3), and miscellaneous (4). Some of these are quoted and discussed below.

Suggestion:	"Put a clock in the I/O room."
Reply:	Done!
Suggestion:	"Eliminate a minimum for region allocated but keep the default of 70K as it is. I don't need 70K for IEBPTPCH etc., I don't use it and don't see why I should pay for it."
Reply:	A reduction of minimum region from 70K to 30K is planned and will become available early in February.
Suggestion:	"That consideration be given to increasing the time limits on High Speed Job Stream from 3 seconds to 5 seconds."
Reply:	Three seconds of S/370 time is a figure which provides at least as much processing as ten seconds did on the S/360. This amount is assigned to the fast service as a matter of carefully considered policy. A policy decision to increase the limit would be an implicit decision to reduce some other aspect of UTCC's service. This limit is, however, one which is subject to frequent policy review.
Suggestion:	"...simple handouts concerning JCL, aimed at irregular users of the system, are badly needed..."
Reply:	UTCC has recognized the need for more adequate information on Job Control Language and is presently preparing a series of bulletins on this and related topics. Refer to the article "Technical Bulletins" in the System/370 General Services section of this Newsletter.

Suggestion: "The water fountain which was always bubbling joyfully at the end of the hall bubbles no more. It was the best water that I knew in 5 1/2 years at University of Toronto. I would like to suggest that it be restored to its rightful place in this University or some other place nearby. -- A new modern 4th generation water fountain simply will not be an adequate replacement. Sigh...I hope the old one has not been destroyed."

Reply: Alas, Father Time has taken its toll and your favourite old fountain is just plain worn out. Our man at Physical Plant concurs with your sentiments but informs us that a strategic casting is broken and irreplaceable. You will perhaps be interested to know that a fountain similar to the one around the corner will be installed in the near future. He says (and asks not be be quoted) that the handle can be jammed open for that perpetual bubbly effect.

PERSONNEL CHANGES

Jennifer Schick

Assisting in the I/O area since December is Mary-Jean Reckie. New to the Computer Centre this month are Brian Lucarelli, who has joined the Remote I/O Group, and Stan Verscay who joined Users Service Group. Cindy Weir, of the Remote I/O Group, left the Centre this month for employment elsewhere.

COMPUTER CENTRE COURSE SCHEDULE - SPRING TERM, 1972

Carol Davidson

Following is a list of the courses being offered by the Computer Centre during the months of February and March. Users wishing to enroll in any of these courses should register with Miss M. Scholz in Room 129, Sandford Fleming Laboratories, phone 928-5270.

Elementary PL/I

- dates: January 31 - February 10 on non-consecutive days
- time and location : 4:00 p.m. in Room 248, Galbraith Building

Intermediate FORTRAN IV

- dates: February 7 and 9, 14 and 16
- time and location: 4:00 p.m. in Room 221, Galbraith Building

JCL - To Run a Job and Use Elementary Disk and Tape Control Cards

- dates: February 14 - 17
- time and location: 4:00 p.m. in Room 132 Sandford Fleming Laboratories

FORTRAN IV Elementary

- dates: March 1 - 16 on alternate days
- time and location: 4:00 p.m. in Room 132 Sandford Fleming Laboratories

Intermediate PL/I

- dates: March 6 - 16
- time and location: 4:00 p.m. in Room 248, Galbraith Building

Teaching Techniques

- dates: March 23 (one-day workshop)
- time and location: 9:30 a.m. - 4:30 p.m.; room to be announced

PAPER RECYCLING

Jerry Palter

Mr. Hubbard, Supervisor of Stores of the University of Toronto, has advised us that the University is now prepared to help us with our project of recycling computer paper by providing improved pick-up facilities supporting the needs of our various areas. Improved and properly identified receptacles will be provided for your unwanted output.

We would like to express our thanks in advance to Mr. Hubbard for this assistance and we urge you all to take advantage of this opportunity to try to help preserve our ecology.

NEWS FROM THE DEPARTMENT OF COMPUTER SCIENCE

Corley Phillips

Christmas Party

The second annual DCS Christmas Party was held, with much good cheer, on December 11. A series of skits entitled Just A Second were presented by the DCS Players, the resident thespian group headed by Professor John Mason. Santa Claus, portrayed by Professor Pat Hume, made a surprise eleven o'clock visit with presents. Many thanks to the Social Committee--Allan Ballard, Mike Bauer, Chris Braun, John Gannon, Nancy Puskar and Larry Weissman -- for their efforts. The party was most successful!

Graduate Committee

The M.Sc. and Ph.D. Committees have merged into one Graduate Committee with Professor Corneil as Chairman. The Committee will oversee the running of the graduate program: handle admissions, develop policy, and handle individual problems. Professor John Mylopoulos, the Graduate Secretary, will be the official contact between the department and graduate students and SGS. Membership of the Graduate Committee consists of the Chairman, Secretary, and five faculty members: Professors Borodin, Gotlieb, Horning, Johnston, and Rossen-Runge, and three graduate students.

Extension Courses

The Department of Computer Science will increase the number of courses offered through the Division of Extension. An enquiry is presently being circulated to persons in industry, high school teaching, and present Extension classes, asking for an indication of interest in Computer Science courses at the undergraduate and graduate levels. A course in which sufficient interest is shown would be scheduled for the late afternoon or evening.

For further information regarding Extension courses, or the possibility of scheduling a more advanced course, please contact Mrs. Corley Phillips, 928-4058.

Squash

A great deal of activity has been taking place on the Squash ladder which is posted outside Room 1103. Two challenge matches a week is not unusual for those who wish to stay at or near the top. There are sixteen rungs on the ladder and, as of January 11, the top six places were held by D. Corneil, G. Wilkes, E. Drumm, J. Lipson, J. Metzger, and W. Enright.

RECENT ACQUISITIONS IN THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Abadie, J., ed.
Integer and Nonlinear Programming.
Amsterdam, North-Holland, 1970.

Beltrami, Edward J.
An Algorithmic Approach to Nonlinear
Analysis and Optimization.
New York, Academic Press, 1970.

Bilbiography on Information Science &
Technology, 1969/70.
American Society for Information Science, 1970

Chapin, Ned.
Computers: A Systems Approach.
New York, Van Nostrand Reinhold, 1971.

Chapin, Ned.
Flowcharts.
Princeton, N.J., Auerbach, 1971.

Computer And Information Sciences
Symposium 3d, Miami Beach, Fla., 1969.
Software Engineering, ed. by J.T. Tou.
New York, Academic Press 1970.

Ghizzetti, Aldo.
Quadrature Formulae, by a Ghizzetti and
A. Ossicini.
Basel, Birkhauser Verlag, 1970.

Greenberger, Martin, ed.
Computers, Communications, and The Public
Interest.
Baltimore, Md., Johns Hopkins Press, 1971

Gruenberger, Fred Joseph.
Computing: A Second Course.
San Francisco, Canfield Press, 1971.

International Conference on Computing Methods in
Optimization Problems, 2d, San Remo, Italy, 1968.
Computing Methods in Optimization Problems, 2; papers.
Ed. by L.A. Zadeh, L. W. Neustadt and A. V. Balakrishnan.
New York, Academic Press, 1969.

Katzan, Harry, Jr.
Computer Organization and The System/370.
New York, Van Nostrand Reinhold, 1971.

NATO Advance Study Institute, Pisa, 1968.
Automatic Interpretation and Classification of Images, ed. by A. Grasselli.
New York, Academic Press, 1969.

Parslow, R.D., Ed.
Advanced Computer Graphics: Economics, Techniques and Applications, ed. by R.D. Parslow and R.E. Green.
London, Plenum Press, 1971.

Project MAC Conference on Concurrent Systems and Parallel Computation, Woods Hole, Mass., June 1970.
New York, ACM, 1970

Protter, Murray H.
Maximum Principles in Differential Equations, by M. H. Protter and H.F. Weinberger.
Englewood Cliffs, N.J., PrenticeHall, 1967.

Reichardt, Jasia, ed.
Cybernetics, Art and Ideas.
London, Studio Vista, 1971.

Richards, Richard Kohler.
Digital Design.
New York, Wiley-Interscience, 1971.

Symposium on Parallel Processor Systems, Technologies, and Applications, Monterey, Cal., 1969.
Parallel Processor Systems, Technologies, and Applications, ed. by L. C. Hobbs et al.
New York, Spartan Books, 1970.

Ton, J.T., ed.
Advances in Information Systems Science, B.3, 1970

Westin, Alan F, ed.
Information Technology in a Democracy.
Cambridge, Mass, Harvard University Press, 1971.

Wilkinson James Hardy.
Linear Algebra, by J. H. Wilkinson and C. Reinsch.
New York, Springer-Verlag, 1971.

Young, David M.
Iterative Solution of Large Linear Systems.
New York, Academic Press, 1971.

PRODUCTION STATISTICS

Jennifer Schick

Table I shows a decrease in jobs run for all systems for the month of December. The drop in activity is attributable to both the Christmas holidays and the change over at the end of the month from the S/360-65 to the S/370-165. The last day of operation for the S/360 was Dec. 24. During Dec. 27 to Dec. 31, 1971, 1969 jobs were run on the General Purpose Job Stream and 3091 jobs on the High Speed Job Stream of the S/370-165. These are not included in the tabulated data.

Table II once again reflects the continuing increase in activity on the High Speed Job Stream. The increase in the total number of jobs run in December 1971 compared with those run in December 1970 was 131% despite the reduction in uptime associated with changing computers.

SYSTEM	OCT	NOV	DEC	DEC/NOV CHANGE
S/360	21,342	21,113	18,280	-14%
7094	787	903	726	-20%
HSJS	118,032	130,560	109,899	-16%
TOTAL	140,161	152,576	128,905	-16%

TABLE I: Jobs Run - October, November, December 1971

SYSTEM	DEC '70	DEC '71	1970/71 CHANGE
S/360	17,868	18,280	+2%
7094	1,429	726	-49%
HSJS	47,486	109,899	+131%
TOTAL	66,783	128,905	93%

TABLE II: Comparison of Jobs Run Dec '70 vs Dec '71

SYSTEM RELIABILITY

Roy Finlayson

The reporting of system reliability is only until December 24. During the final week of the month the S/370 was operating in a production/test environment.

The reliability of the S/360 system for November and December is shown in the following table for comparison.

	MONTH	UPTIME	MTBF
LOCAL AND REMOTE	November	92.8%	4.5 hrs.
GENERAL PURPOSE PROCESSING	December	96.2%	10.7 hrs.

Both uptime and mean time between failures (MTBF) improved over the previous month. The only major problem in December was a core bug which proved to be a bad circuit board in the mainframe.

CREDIT REQUESTS FOR DECEMBER

Herb Kugel

The number of credit requests this month was, in percentage terms, about the same as last month. A decrease in human errors was balanced by an increase in software problems involving the new software for the S/370.

	DECEMBER			NOVEMBER
	S/360	7094	TOTAL	TOTAL
HUMAN	13	0	13	21
SOFTWARE	34	0	34	22
HARDWARE	4	0	4	8
TOTAL	51	0	51	51
% of JOBS RUN			.22%	.22%

A LAST LOOK BACK

C. A. Ford

The advent of the System/370-165 marks the end of the S/360 generation at University of Toronto Computer Centre, at least for general OS processing and high speed "student" jobs. This S/360 era began here in August of 1968, when the first of our S/360-65 systems went into service. It was then coupled to an S/360-50, along with the IBM 7094 II. The S/360-50 was replaced by a Model 65 in January of 1969.

In early 1969 Dr. C. C. Gotlieb, then the Director of the Computer Centre, delegated a special committee to evaluate the status of the 360/360/7094 Dispatcher project and to recommend a system evolution aimed at increased reliability and productivity. This study led to the discontinuation of the Dispatcher system, with the System/360 computers becoming separate systems using the HASP and OS/MVT operating systems. The 7094 at once began to slump in volume of service, despite its own excellent computational power.

A series of histograms reproduced below show how the pattern of use has changed over the span of four and a half years since July 1967.

At the beginning of this period the 7094 II was the only production machine and PUFFT (Purdue Fast Fortran) was the "student job" processor. Shown are the general purpose 7094 and S/360 job volumes, the PUFFT and High Speed/360 job volumes, hours of 7094 "CPU" time and S/360 "formula time"[1], and the average time per job in these measures for the two types of machines.

Now, with one S/370-165 in place of parts of two S/360s, we can all make our own estimates of just how these trends will proceed during 1972.

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(1) S/360 Formula Time is CPU time plus Core Usage multiplied by the CPU-to-core price ratio, in terms of the July/December 1971 price list. In the earlier years PCP job-to-job time and, later, Equivalent Run Time were the accounted S/360 "time" measures. These data were converted to formula time using empirical relationships estimated from the trends in accounting data through periods of time covering the changes in measure.

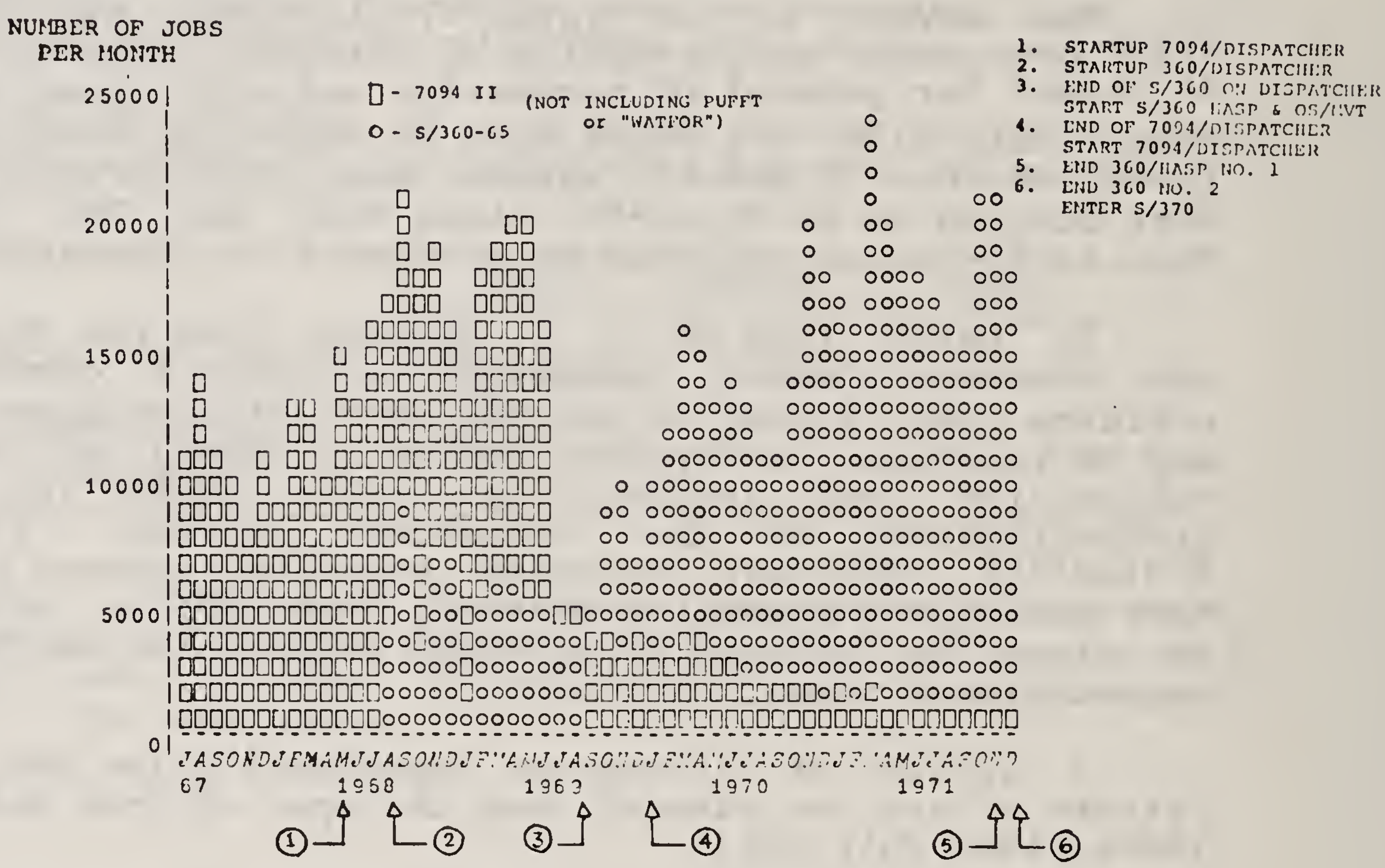


FIG 1 S/360 NUMBER OF JOBS PER MONTH
(7094 II & S/360-65)

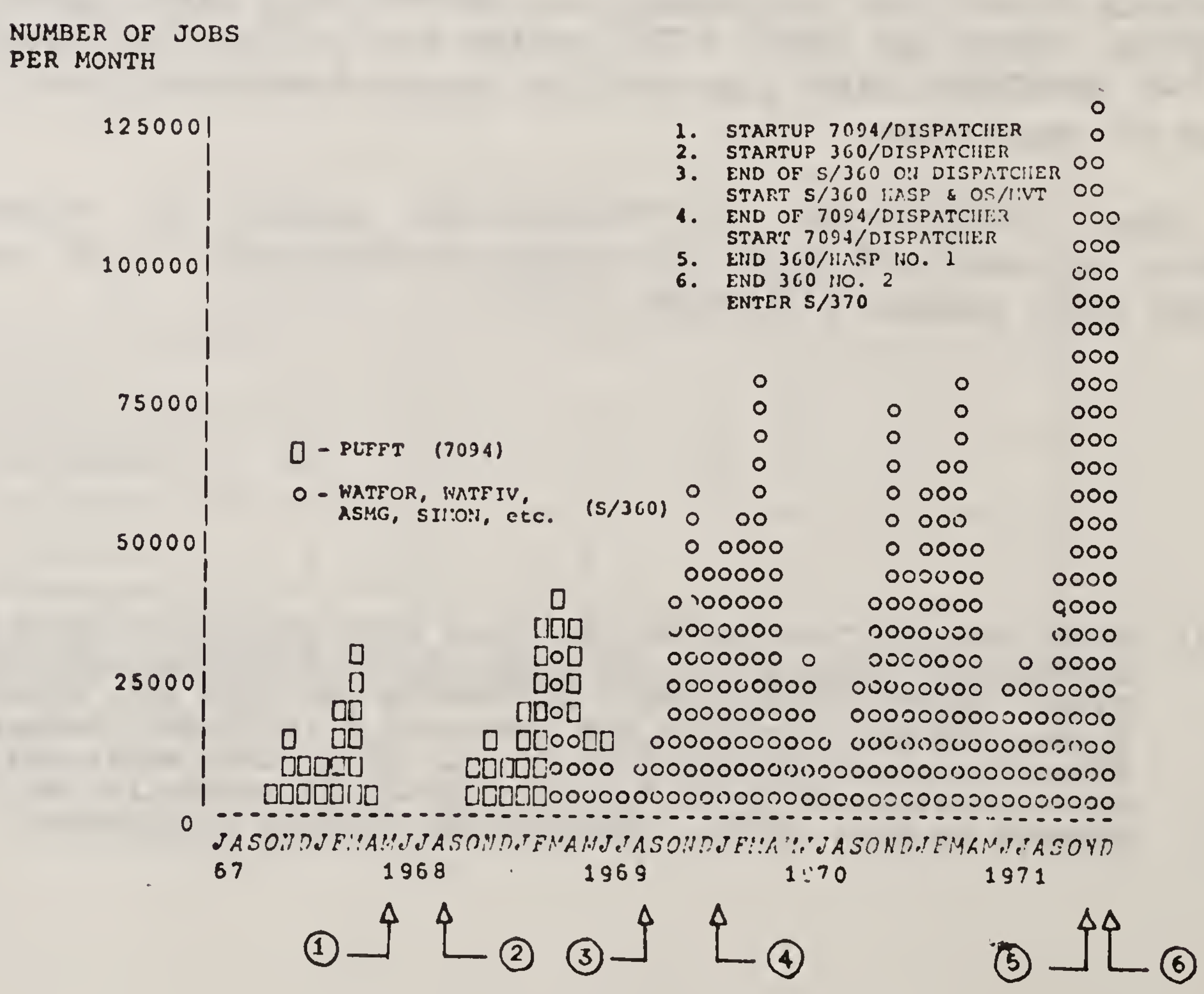


FIG II JOBS PER MONTH, PUFFT (7094)
AND S/360 HIGH SPEED JOB STREAM

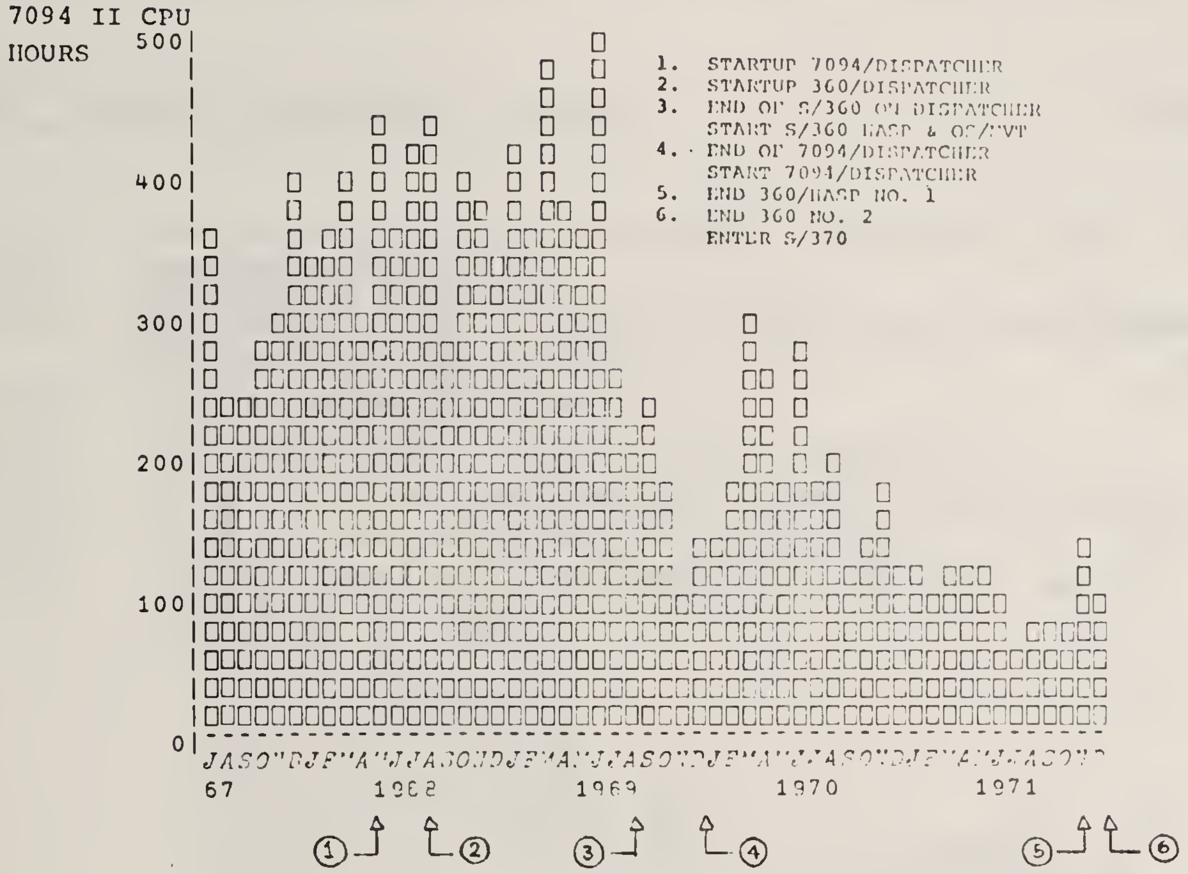


FIG III 7094 CPU HOURS PER MONTH

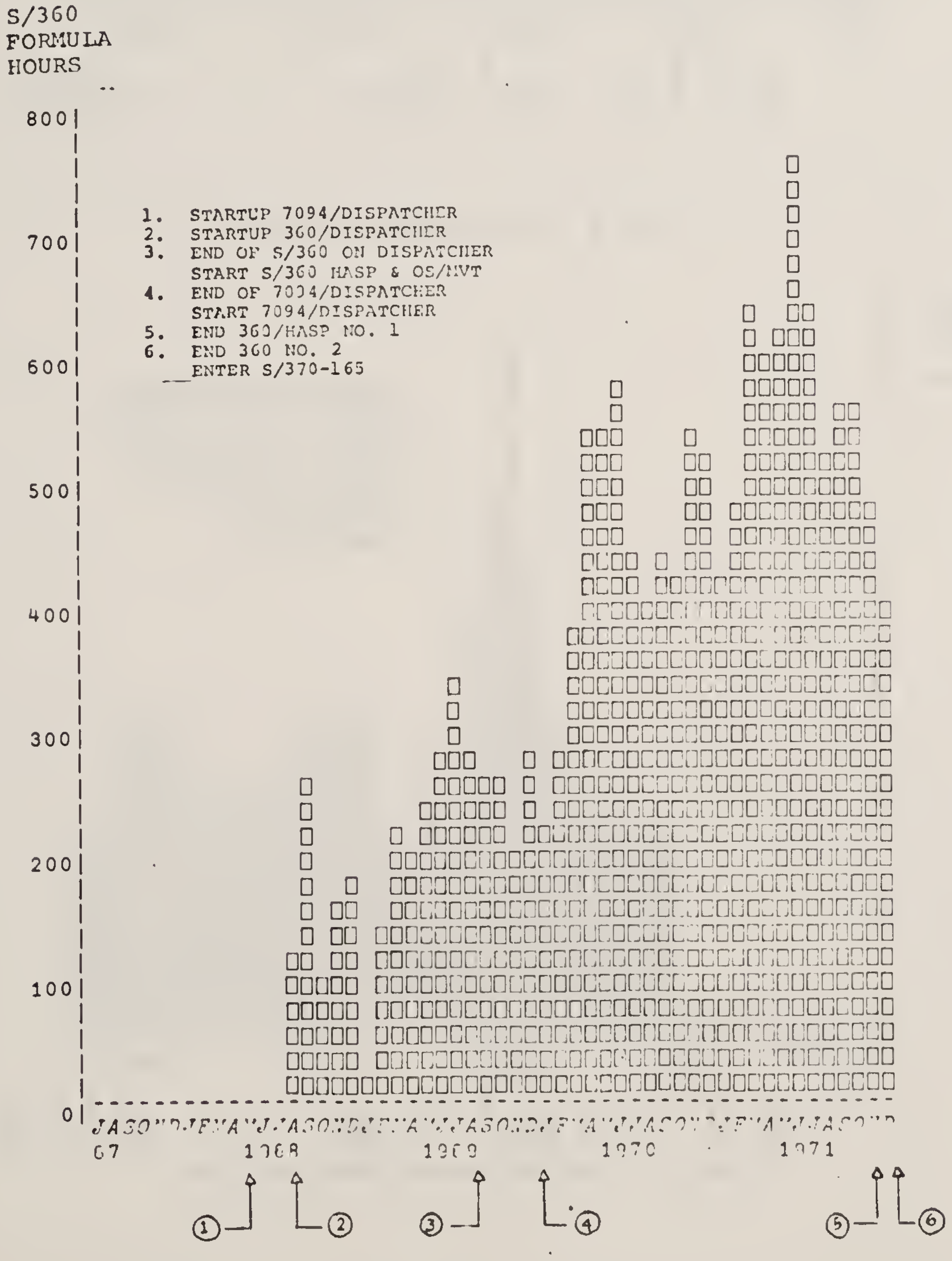


FIG IV S/360 FORMULA HOURS PER MONTH
(CPU + 0.6 x CORE USAGE) HOURS

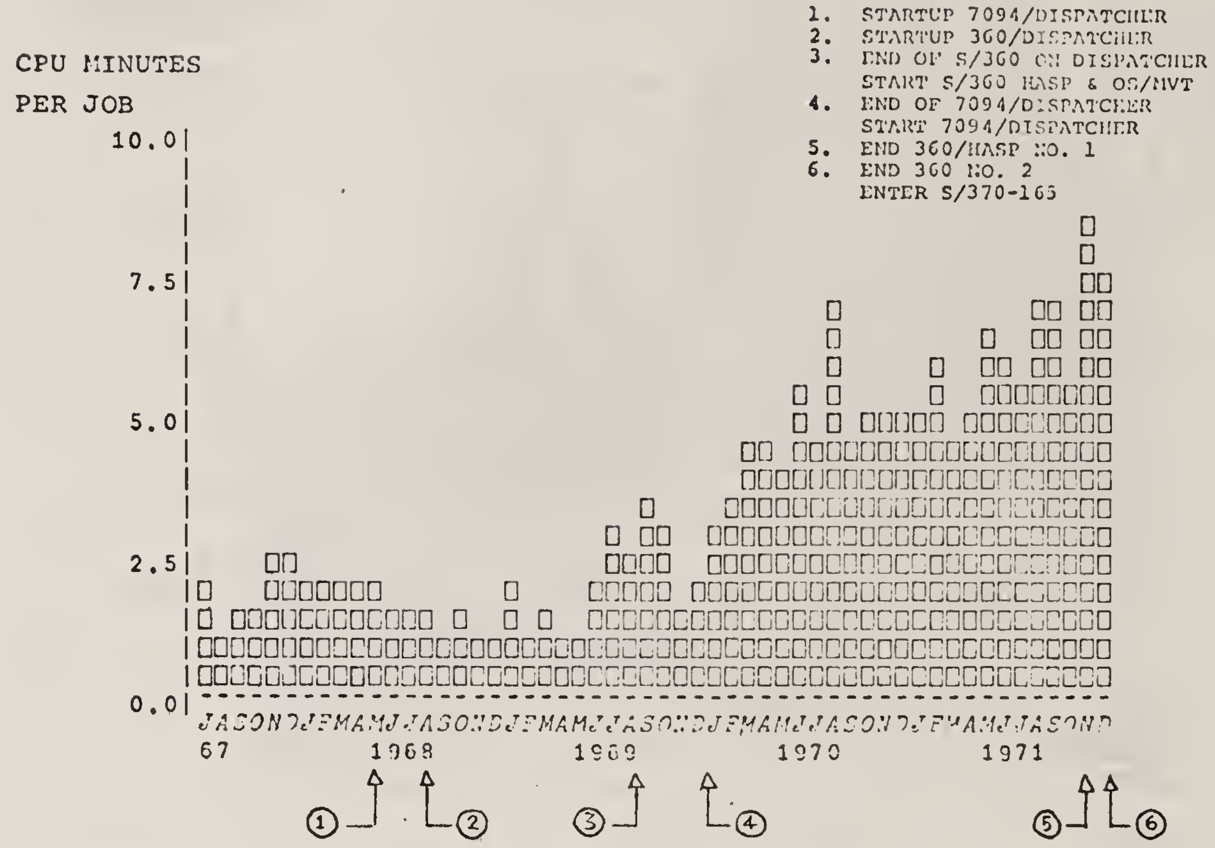


FIG V 7094 CPU TIME PER JOB

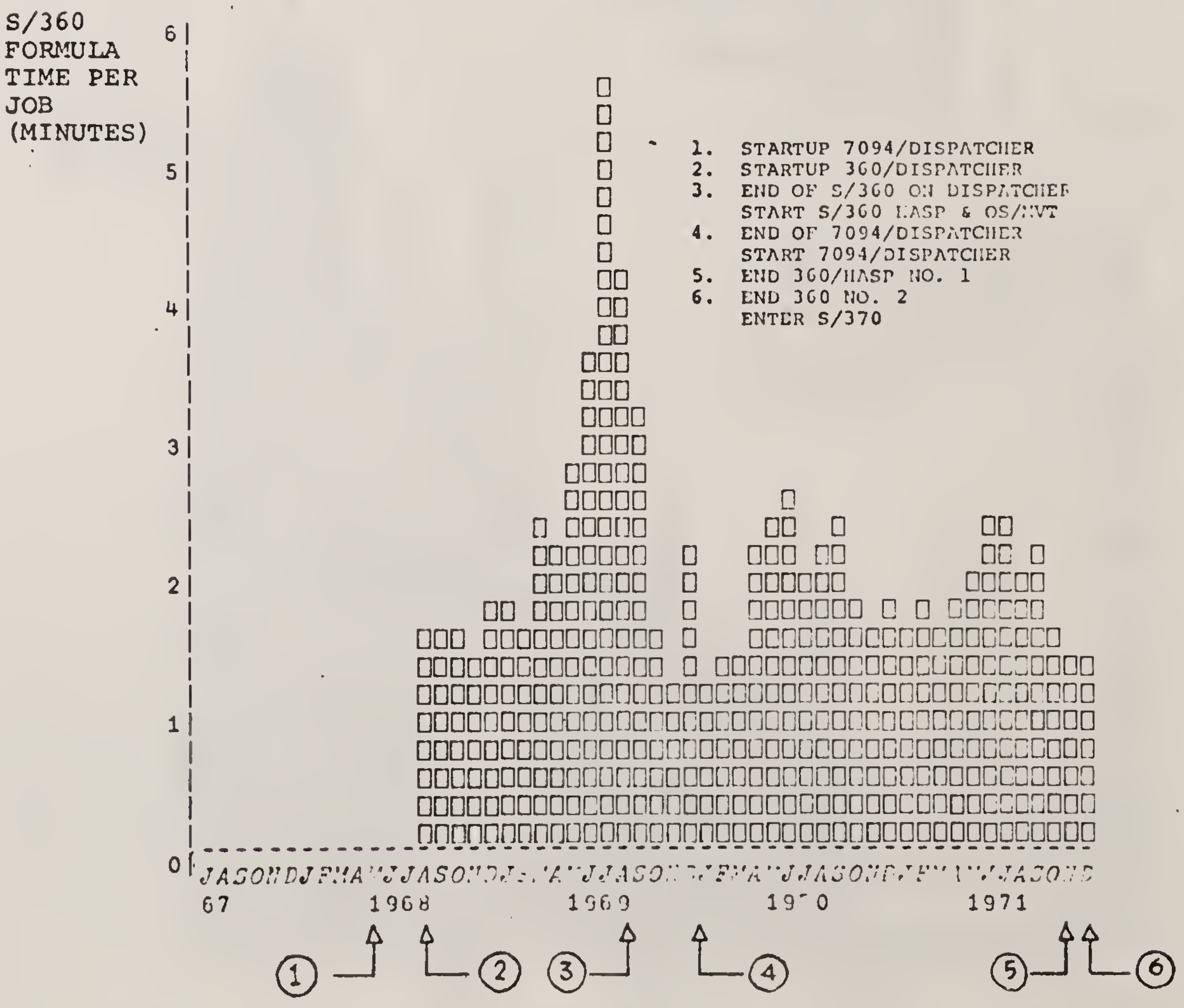


FIG VI S/360-65 FORMULA TIME PER JOB

SYSTEM STATUS BULLETINS ISSUED

Janet Marsh

79:71:1	Power Shutdown on Sunday, December 19, 1971
80:71:1	FORMAC Problems
81:71:1	Schedule for Period -- Thursday December 23, 1971 to Monday January 3, 1972
82:71:1	SPEC and Job Forms
83:71:1	System/370 - 165 Up and Running
1:72:1	STATOPEN Procedure For Running BMD Programs
2:72:1	New Level of WATFIV Available
3:72:1	System Status Bulletins in Effect as of January 10,1972

ACCOUNTING INFORMATION

Jerry Palter

A number of options are available to each authorization code holder which allows him to restrict the usage of his code in the following ways:

- a code can be flagged to prevent its use with a Priority 8 (rush) Class job;
- a code can be flagged to prevent its use when the holder's allocation has been exhausted;
- a code can be provided with a lock character which prevents unauthorized use. Details concerning this option are provided in SSB 37:71.

All of the above options are individually available with the codes you now hold and if you would like to take advantage of any or all of them please contact Mrs. M. Rankin at 928-8702.

HOURS OF SERVICE I/O AND AUXILIARY SERVICES

Derry Cox

The new room locations and hours of service for the I/O and Auxiliary Service areas are as follows:

I/O Services (Room 106 Sandford Fleming Laboratories)

Monday to Friday:

Midnight - 6 A.M.	full service
6 A.M. - 8 A.M.	output only
8 A.M. - 10 P.M.	full service
10 P.M. - Midnight	output only

The hours from 6 A.M. - 8 A.M. and 10 P.M. - midnight are used for preventive maintenance for the machines, and software maintenance and development respectively. Thus, input cannot be accepted during these times. Users are cautioned that occasionally input service cannot be guaranteed from 3 A.M. - 6 A.M. In such cases this information will be posted in Room 106 and available from the I/O information number 7373.

Saturday and Sunday: full service 9:00 A.M. - 5:00 P.M.

Auxiliary Services (Room 109 Sandford Fleming Laboratories)

Monday to Friday:	8 A.M. - 10 P.M.
Saturday and Sunday:	9 A.M. - 5 P.M.

PRINTER FORMS DESIGN SURVEY

Derry Cox

In the past we have received numerous suggestions about the design of our printer form. Therefore, during the month of January, displays of a proposed new standard printer form have been posted in the I/O Room (Room 106) and at the six remote input/output terminals. The facsimile of the "first draft" form reflects many of these suggestions, and attempts to achieve an attractive, practical standard form that satisfy the needs of most users.

At each of these displays you will find an explanatory note, a facsimile of the proposed form, a complete list of the specifications for the form design, and some comments sheets for your convenience. Please assist us by examining this display and sending us your comments and suggestions. Ignore the closing date of January 20, 1972 on the comments sheet as the survey will be continued through February.

SPEC AND THE UTCC JOB FORM

Janet Marsh

On January 3, 1972 a revised set of conditions which require the use of the SPEC program or the UTCC Job Form went into effect. These conditions are as follows:

(1) CLASS A jobs use SPEC for
    (a) writing to the operator.

(2) CLASS B jobs use SPEC for
    (a) writing to the operator;
    (b) indicating if the tape/disk external label is different from the tape/disk internal label;
    (c) requesting that a tape be mounted write enabled.

(3) CLASS C jobs always use the UTCC Job Form. Only the pertinent sections need to be completed.

(4) CLASS A, B, and C jobs use the UTCC Job Form for
    (a) special printer instructions;
    (b) special CALCOMP instructions.

Users having questions should approach the I/O Shift Supervisor in S.F. Room 106.

SELF-SERVICE READER

Derry Cox

One of the card readers in Room 106 has been turned around so that you may submit your own jobs if you so desire. The list of instructions fastened to the top of the reader. Please read before using it. One of the operators will be happy to assist you if you wish further instructions. We would ask you to help us make this an efficient service by:

(1) using the reader "one at a time",

(2) remembering to mark or mutilate your HASP JOB card so that you won't use it again after reading;

(3) passing your UTCC JOB FORM to the operator if you are using CLASS C.

If you prefer you may still pass your deck to the operator who will read it on the other reader.

KEYPUNCH SERVICE

Derry Cox

In addition to fulfilling a vital internal function for UTCC staff, the UTCC keypunching service is available to the user community. Submissions to this service will be keypunched and/or verified on a "first-in-first-out" basis. Users are requested to bring their coding to the Auxiliary Services area and complete a Unit Record Request Form. At this time a claim stub will be issued to the user and a preliminary time-of-completion estimate will be given. Completed work may be claimed in the Auxiliary Services area.

Urgent requests for rush service or requests for exceptionally long jobs may be made to the I/O Supervisor in Room 112 Sandford Fleming Laboratories.

Users are reminded that this is not a free service - keypunching and verifying are each $5.00 per hour.

ARTS AND SCIENCE HASP REMOTE TERMINAL

Al Jones

Effective January 1972, the Computer Centre assumed the responsibility of operating the Arts and Science remote input-output terminal. This terminal is located in Room 2105 of the Sidney Smith Building, 100 St. George St.

A number of physical changes have occurred at this terminal in an effort to facilitate its operation, from both the operator's and the user's point-of-view.

The hours of operation will remain the same (9:00 a.m. to 5:00 p.m. Monday to Friday).

The most important change is that the terminal has been converted to an 'open shop' terminal where, if desired, users may read in their own programs. Operators will still be on hand to file user output and to assist users when required.

UTCC is anxious to serve the users of this remote terminal and welcomes any suggestions, proposals, or complaints which aim toward this end.

The terminal supervisor is Alan Jones who may be contacted in Room 112 Sandford Fleming Laboratories, phone 928-6220.

ROUTING FROM REMOTE TERMINALS

Al Jones

One of the new options provided by the present version of HASP (Version 3) is the ability to route printed or punched output from any input station to any printer elsewhere in the system.

To use this facility place the following card immediately behind your JOB cards.

```
ccl       10       16
  /*ROUTE  PRINT    destination
           PUNCH
```

where "destination" =

REMOTE1 - New Physics terminal (no punch)
REMOTE2 - Arts and Science terminal (no punch)
REMOTE3 - Scarborough College terminal
REMOTE4 - Erindale College terminal
REMOTE5 - Institute for Aerospace Studies
REMOTE6 - School of Business (no punch)
LOCAL - central computer facility

This function has many obvious advantages to the user who travels between campuses, and makes output retrieval much more convenient.

TECHNICAL BULLETINS

Robin Williams

The Computer Centre has begun issuing a series of Technical Bulletins on topics which we feel are of interest to our users. The intention is that each Bulletin will cover a specific, technical item in depth, emphasizing the "how to" aspect. In general, the material covered by a Technical Bulletin will be of a relatively permanent nature. Users are encouraged to file these bulletins along with other manuals on the particular subject. In aid of this the Bulletins will be distributed already punched for the three-ring binder.

The initial items will concentrate on the use of the IBM utility programs to perform specific tasks. Later offerings are expected to cover a more general selection of items related to features in the IBM Operating System, language processors and utilities. Users with suggestions for new topics or improvements to existing bulletins should pass them on to any member of the Users' Services Group.

Bulletins are available from Rooms SF-103 or SF-130 and are also sent to each of the HASP remote terminals for distribution. Individual copies may be obtained by contacting the USG receptionist, telephone: 928-5270. A list of Bulletins published, revoked, or superseded each month will appear in the Newsletter and a list of all current bulletins will be published periodically.

The Technical Bulletins available at the time of writing are:

No. 1	The Use of Instream Procedures in OS/360 Release 20.1
No. 2	COBOL F to COBOL U Conversion
No. 3	Compressing Partitioned Data Sets
No. 4	Unloading and Loading Partitioned Data Sets to and from Magnetic Tape.
No. 5	B37 and D37 Completion Codes under OS/360 Release 20.1.

STATISTICS ON CATALOGUED PROCEDURE USAGE

Robin Williams

Owing to the change from System/360 to System/370 during December, the data sets containing the procedure usage counts were lost. Consequently, it is not possible to give these statistics this month, but they will resume again in next month's Newsletter.

SYSTEM RELIABILITY

Sam Goldfarb

Since the establishment of a dedicated Interactive Systems machine, there has been a noticeable improvement in stability of the Interactive Systems service. Some problems that have arisen have resulted primarily from hardware malfunctions or operating errors; in fact, the system data set overflow failures recorded below occurred as a result of being remiss with regard to certain operating procedures. The tables below summarize the time lost from the normal production schedule during the period Monday, November 22, 9 a.m. to Thursday, December 30, 12 midnight , inclusive. The total number of scheduled hours of operation during this period was 613.5 hours. Table 1 shows the total time lost due to late starts (IPL's). Much of the time lost on Saturdays was a result of power checks (three occasions) during the power-up stage of the IPL (the machinery is powered down at the end of Friday's schedule) while Thursday's late start total was a result of an Operator error (one occasion).

Table 2 shows time lost due to system failures for each of the systems. In terms of uptime, the losses were 0.5%, 0.6%, and 1.1% for APL, ATS, and CPS respectively. Thus, on the whole, the first full month of operating in the new environment has shown a most satisfactory trend in reliability.

Day System	Sun 9:00	Mon 0:00	Mon 9:00	Tues 9:00	Wed. 9:00	Thurs 9:00	Fri 9:00	Sat 9:00	Total
APL	7	19	0	0	0	54	7	88	175
ATS	8	22	0	12	7	58	24	98	229
CPS	15	27	0	9	5	80	31	101	268

Table I: Total Time Lost at Scheduled IPL (mins.) November 22 to December 30, 1971

System	DATE	TIME DOWN	TIME UP	TIME LOST (MINS)	REASON
APL	Sun. Nov. 28	22:41	22:50	9	Disk Errors (hardware)
	Wed. Dec. 29	19:11	19:13	2	Operator Error
ATS	Tues. Nov. 23	14:53	15:05	12	Data Set Overflow
	Mon. Dec. 13	13:21	13:22	1	LCS Failure (hardware)
CPS	Tues. Nov.23	12:50	13:14	24	Data Set Overflow
	Wed. Nov. 24	18:58	20:27	89	Disk Errors (hardware)
	Wed. Dec. 29	14:58	15:30	32	Data Set Overflow

Table II: System Failures November 22 to December 30, 1971

APL FILE FACILITY

Sam Goldfarb

A file subsystem for APL is being obtained from I. P. Sharp, Associates. The file facility is similar to the version currently available on the I. P. Sharp system. This new capability, which has already undergone a successful test period at the University of Waterloo, will soon be tested on the Interactive Systems machine and is expected to become available to APL users in early February. User manuals describing the file subsystem are on order.

Some additional enhancements are also expected to become available with the file facility. Among these additions are:

- formatting functions for more extensive control of APL output;
- tab support on input and output (the tab support will be available both as a system command and as an executable function);
- an extended "COPY" command to support multiple items within the same command;
- an executable function to effect a sign-off as though a ")CONTINUE HOLD" command had been issued.

Detailed information on the use of the new features will be made available shortly.

ATS HIGH SPEED TN PRINT OUTPUT

Sam Goldfarb

The TN printer train being used for ATS High Speed Output is the standard IBM TN train. ATS users can generate any character of the TN train by following the method described in the "ATS/360 Terminal Operations Manual", Appendices D and E. The EBCDIC characters that must be generated with their resulting printer characters are illustrated below:

second hexadecimal character

first hexadecimal character

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2																
3																
4											¢	.	<	(	+	|
5	&										!	$	*	)	;	¬
6	-	/										,	%	_	>	?
7											:	#	@	'	=	"
8		a	b	c	d	e	f	g	h	i		{	≤	(	+	┼
9		j	k	l	m	n	o	p	q	r		}	⊐	)	±	■
A	–	°	s	t	u	v	w	x	y	z		└	┌	[	≥	•
B	0	1	2	3	4	5	6	7	8	9		┘	┐	]	≠	—
C		A	B	C	D	E	F	G	H	I						
D		J	K	L	M	N	O	P	Q	R						
E			S	T	U	V	W	X	Y	Z						
F	0	1	2	3	4	5	6	7	8	9						

TN Printer Train Character Set

CPU TIME LIMIT ON THE S/370

C. A. Ford

Benchmark studies were conducted on jobs using the High Speed Job Stream language processors to compare S/360-65 and S/370-165 performance. CPU time during execution is the important criterion affecting users. These studies indicated that three seconds of S/370 CPU execution would be more than equivalent to ten seconds on the S/360.

The most recent test, using jobs designed to exercise the least-improved of the S/370 arithmetic instructions, substantiated the ten-to-three second spread. Some processors showed an even greater improvement, ranging as high as eighteen-to-three (ASMG).

A PL/C job exploiting the S/370 floating-point instructions ran the equivalent of over fourteen seconds of S/360 time in three seconds on the S/370. Its slower integer arithmetic counterpart was the slowest of these test jobs, just making the ten-to-three goal.

Users should feel confident that the new three-second limit offers as much or more computation than did the old S/360 ten second limit. Also be aware that any two S/370 jobs may compare quite differently to their S/360 counterparts, depending on the mix of instructions found in the program.

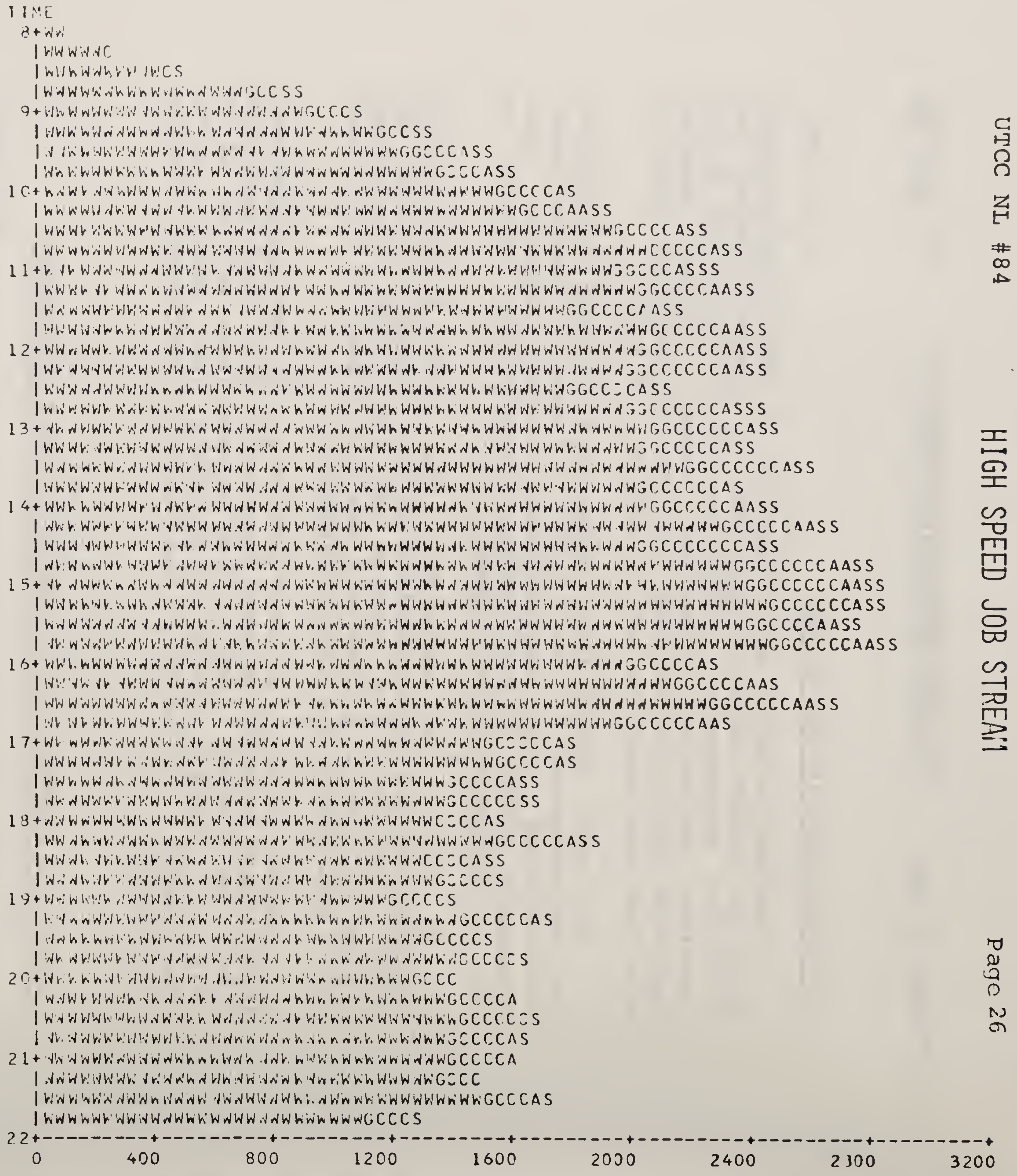
PRODUCTION STATISTICS FOR THE HIGH SPEED JOB STREAM

John Lees

The accompanying histograms show the total number of programs run through the High Speed Job Stream during the month of December, as well as a breakdown of these jobs between EUT and ASUT. It should be noted that the histograms included here represent absolute total production as compared to the histograms in December's Newsletter which showed the total number of jobs run on an average day in November.

HIGH SPEED JOB STREAM

```
ALL      JOB SUMMARY  *************   FOR C1-311271
      W        G        C        P        A        S      TOT
     84        0        5        0        4        4       97
    230        6       41        0        8       18      303
    427       25       67        5        8       45      577
    698       58      103       20       10       84      978
    893       72      152       12       27       63     1219
   1134       61      110        3       37       84     1429
   1225       81      140       12       41       94     1593
   1352       64      149       14       59       90     1728
   1556       72      161        1       77       71     1938
   1631       68      131        0       95       84     2009
   1920       77      160        0       76      115     2348
   2058       63      197        6       66      113     2503
   1944       84      148        0       73      142     2391
   2017       80      153        0       83       82     2430
   1731       85      183        1      101      112     2268
   2056       91      185        0       93       97     2523
   2030      104      227        4       93      109     2567
   1970       94      245        2      107      118     2536
   1761       91      185        3       63      104     2207
   1992      130      225        8       75      133     2564
   2056       89      264        4       54      109     2576
   2034       88      205        2       54      105     2439
   2168       81      262        0       60      108     2679
   2008       67      249        0       62       73     2459
   2068       90      211        1       84      108     2562
   2298       64      232        0       86       95     2775
   2022      100      291        0       61      111     2585
   2356       84      251        0       87      109     2887
   2399       82      260        0       98       94     2933
   2474       79      242        1       73      112     2981
   2372      104      193        0       95       84     2848
   2443       82      203        0      104       97     2929
   1998       81      172        6       74       65     2396
   2143       86      177        2       92       77     2577
   2241       89      230        1       80       92     2733
   1950       97      215        4       86       70     2422
   1484       71      209        0       52       60     1886
   1533       59      175        0       50       75     1892
   1361       46      173        0       46       82     1708
   1391       47      205        0       37       97     1777
   1326       37      175        0       46       61     1646
   1528       40      203        0       55       99     1925
   1282       36      179        0       48       86     1631
   1342       44      180        2       38       74     1680
   1195       55      170        2       34       54     1510
   1422       53      215        1       45       61     1797
   1298       45      181        1       31       42     1598
   1402       44      175        1       33       56     1712
   1245       46      147        1       28       33     1500
   1365       40      175        1       40       38     1679
   1408       43      224        0       39       42     1756
   1395       52      183        1       48       50     1734
   1364       71      190        0       49       39     1713
   1327       66      149        0       39       33     1614
   1489       61      159        0       41       60     1810
   1109       43      133        4       31       41     1366
  -----   ------   ------   ------   ------   ------   ------
  91107     3769    10271      126     3290     4454   113013
```



```
EUT     JOB SUMMARY   *************   FOR 01-311271
     W      G      C      P      A      S    TOT TIME
    39      0      5      0      4      0     48  3+
   140      6     27      0      8      5    166   |WWW
   233     19     47      5      7     24    335   |WWWWWC
   348     58     72     20      4     48    550   |WWWWWWWWGCS
   410     69    132     12     11     18    652  9+WWWWWWWWWWGCCC
   504     55     97      3      7     43    709   |WWWWWWWWWWWWGCCS
   629     69    114      8     13     39    872   |WWWWWWWWWWWWWWWGCC
   683     57    133     10     25     33    941   |WWWWWWWWWWWWWWWWWGCCC
   805     52    149      1     20     34   1061 10+WWWWWWWWWWWWWWWWWWWWGCCC
   803     50    121      0     38     34   1046   |WWWWWWWWWWWWWWWWWWWWGCCC
   971     54    141      0     41     65   1272   |WWWWWWWWWWWWWWWWWWWWWWWWGCCCAS
  1003     60    153      6     35     62   1319   |WWWWWWWWWWWWWWWWWWWWWWWWWGCCCS
   958     73    124      0     47     65   1267 11+WWWWWWWWWWWWWWWWWWWWWWWGCCCAS
  1019     72    137      0     46     50   1324   |WWWWWWWWWWWWWWWWWWWWWWWWWGCCCAS
   877     79    141      1     59     74   1231   |WWWWWWWWWWWWWWWWWWWWWGCCCAS
  1058     79    155      0     63     63   1418   |WWWWWWWWWWWWWWWWWWWWWWWWWWGCCCAS
  1022     91    170      4     55     78   1420 12+WWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCAS
   952     83    201      2     67     72   1377   |WWWWWWWWWWWWWWWWWWWWWWWGGCCCCCAS
   876     77    145      3     27     55   1183   |WWWWWWWWWWWWWWWWWWWWWGCCCS
   950    114    184      8     43     56   1355   |WWWWWWWWWWWWWWWWWWWWWWWGGCCCCAS
   965     77    203      4     28     52   1329 13+WWWWWWWWWWWWWWWWWWWWWWWWCCCCCCS
  1027     61    166      2     36     52   1344   |WWWWWWWWWWWWWWWWWWWWWWWWWGCCCCS
   995     65    200      0     34     44   1338   |WWWWWWWWWWWWWWWWWWWWWWWWGCCCCCS
   948     42    187      0     32     34   1243   |WWWWWWWWWWWWWWWWWWWWWWWGCCCC
   915     69    148      1     41     38   1212 14+WWWWWWWWWWWWWWWWWWWWWWGCCCA
   997     55    173      0     33     48   1306   |WWWWWWWWWWWWWWWWWWWWWWWWGCCCCS
   929     89    216      0     27     40   1301   |WWWWWWWWWWWWWWWWWWWWWWWGGCCCCCS
  1013     66    175      0     35     34   1323   |WWWWWWWWWWWWWWWWWWWWWWWWWGCCCC
  1093     60    178      0     48     29   1408 15+WWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCA
  1008     69    163      0     25     39   1304   |WWWWWWWWWWWWWWWWWWWWWWWWWGCCCC
  1021     80    122      0     64     34   1321   |WWWWWWWWWWWWWWWWWWWWWWWWWGGCCCA
  1117     69    145      0     69     53   1453   |WWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCAS
   896     60    113      3     46     24   1142 16+WWWWWWWWWWWWWWWWWWWWWWGCCA
   928     65    116      2     55     36   1202   |WWWWWWWWWWWWWWWWWWWWWWWGCCA
  1001     68    163      0     46     44   1322   |WWWWWWWWWWWWWWWWWWWWWWWWWGCCCCAS
   890     63    151      4     48     39   1195   |WWWWWWWWWWWWWWWWWWWWWWGCCCA
   712     55    157      0     23     23    970 17+WWWWWWWWWWWWWWWWWGCCC
   779     44    133      0     30     17   1003   |WWWWWWWWWWWWWWWWWWWGCCC
   687     38    142      0     24     15    906   |WWWWWWWWWWWWWWWWWCCC
   663     34    153      0     17     19    886   |WWWWWWWWWWWWWWWWCCC
   611     23    149      0     29     15    827 18+WWWWWWWWWWWWWWWCCC
   748     22    166      0     37     15    988   |WWWWWWWWWWWWWWWWWWCCCC
   653     25    152      0     26     21    877   |WWWWWWWWWWWWWWWWCCC
   714     33    148      2     13     13    923   |WWWWWWWWWWWWWWWWWCCC
   597     42    138      1     21     20    819 19+WWWWWWWWWWWWWWGCCC
   725     44    174      0     27     17    987   |WWWWWWWWWWWWWWWWWWGCCCC
   704     30    141      0     19     13    907   |WWWWWWWWWWWWWWWWWCCC
   707     35    138      0     15     18    913   |WWWWWWWWWWWWWWWWWCCC
   589     31    109      0     18     10    757 20+WWWWWWWWWWWWWWCC
   663     34    128      0     18     14    857   |WWWWWWWWWWWWWWWWCCC
   626     26    156      0     23     18    849   |WWWWWWWWWWWWWWWCCC
   669     41    136      0     22     21    889   |WWWWWWWWWWWWWWWWGCCC
   659     60    140      0     28     17    904 21+WWWWWWWWWWWWWWWWGCCC
   608     57     95      0     20     13    793   |WWWWWWWWWWWWWWWGCC
   655     52     97      0     18     19    841   |WWWWWWWWWWWWWWWWGCC
   496     39     99      0     21     15    670   |WWWWWWWWWWWWCC
 ----- ------ ------ ------ ------ ------ ------ 22+---------+---------+---------+---------+---------+---------+---------+---------+
 43312   3041   7830    102   1731   1891  57907   0        400       800      1200      1600      2000      2400      2800      3200
```

```
ASUT    JOB SUMMARY  *************  FOR 01-311271
   W      G      C      P      A      S    TOT  TIME
   31     0      0      0      0      4     35   8+
   90     0     14      0      0     13    117    |WW
  191     6     20      0      1     21    239    |WWW W
  344     0     35      0      6     36    422    |WWWWWW WW
  397     3     20      0     15     45    481   9+WW WW WWWWWS
  407     6     10      0     21     41    575    |WW WWWWWWWWWWS
  474     9     20      0     22     49    574    |WWWWWWWW WWWS
  589     7      3      0     35     51    690    |WW WWWW WWWW WWWWS
  626    20      9      0     49     37    741  10+WW WWWWWWWW WWWW WA
  666    18      3      0     54     50    796    |WW WWWWWWW WWWWWWWAS
  824    23     17      0     26     50    940    |WWWWWWWW WWWW WWWWWWWS
  699     3     42      0     27     51   1022    |WWWWWWWWWWWWW WWW WWWWWWWWCS
  799    11     22      0     24     77    933  11+WW WWWWW WWW WWWW WWWWWWS
  854     8     30      0     27     32    951    |WWWWWWWW WWWWWWWW WWWWWWW
  727     6     42      0     35     38    848    |WW WWWWWWWWWWW WWWWWWWC
  829    12     31      0     28     34    934    |WW WW WW WWWWW WWWW WWWWWW
  814    13     50      0     34     31    942  12+WWWWWW WWWWW WWWW WWWWWWC
  858    11     44      0     36     46    995    |WWW WWWWWWWW WW WW WWWWWWCS
  755    14     35      0     28     49    882    |WWW WWWWWWWW WWWWW WWWWS
  696    16     42      0     24     77   1055    |WW WW WWWWWW WWWW WWWWWWWWCS
  946    12     59      0     21     57   1095  13+WWWWWWWWWWWWWW WW WW WWWWWWCS
  880    27     40      0     17     53   1017    |WWWW WWWW WWWWW WW WWWWWWCS
  982    16     60      0     18     64   1140    |WWWWWW WWWWWWWWW WWWWWWW WWCS
  929    24     62      0     24     38   1077    |WW WWWWW WWWW WWWWW WW WWWWW WWC
  973    21     60      0     41     70   1165  14+WWW WWWW WWWWWW WW WWWWWWWWW WWCAS
 1109     9     55      0     29     47   1249    |WWWWWW WWWWWWWWWWWW WWWWWWWWWWWWCS
  921    11     67      0     26     70   1095    |WWWW WWWWWWW WWW WWWWWWWWWWCS
 1143    18     75      0     43     75   1354    |WWWWWWWW WW WWWWWW WWWWWWWWWWWWWWWCAS
 1155    22     73      0     37     65   1352  15+WW WWWWWWWWWWWWWW WWWWWWWWW WWWWWWCS
 1239    10     71      1     41     73   1435    |WWWWWW WWWWWWWWW WWWWWWW WWWWWWWWWWCAS
 1173    24     64      0     29     50   1340    |WWWWWWWWWWWWWWW WW WWWWWWWWWWWWWWCS
 1122    13     53      0     26     44   1258    |WWWWWWWWWWWWWWWWWWWWWW WWWWWWWCS
  957    21     55      3     26     41   1104  16+WWWWWWWWWWWWWW WWW WWWWWWCS
  991    21     53      0     31     41   1142    |WWWW WW WWWWWWWWWWWWWWWWWWWWCS
 1061    21     62      1     29     48   1222    |WWWWWWWWWWWW WW WW WWWWWWWWWWWWWCS
  922    34     61      0     31     31   1079    |WWWWWWWWWWWWWW WWWWWWWWWWWWC
  738    16     52      0     37     37    880  17+WWWWWW WWWWWWWW WWWWC
  741    15     41      0     20     58    875    |WWWW WW WWWWWWWWWW WWWWCS
  668     8     31      0     22     67    796    |WW WWWWWW WW WWWWWWWS
  726    13     52      0     20     78    889    |WW WWWWW WW WWWWWW WWWWWCS
  706    14     27      0     17     46    810  18+WWWWWWW WWWW WW WWWWWWS
  778    18     37      0     18     84    935    |WWWWWWWWWWWWWWWWWWWWWWWSS
  625    11     27      0     22     65    750    |WWWWWWWWWW WWWWW WWWS
  628    11     32      0     25     61    757    |WWWWW WWWWWWWW WWW WWS
  592    13     32      1     13     34    685  19+WWWWWWWWWW WWWWWW
  692     9     41      1     18     44    805    |WW WWWW WWWWW WWWWWWWWCS
  588    15     40      1     12     29    685    |WWWWWWWWWWWWWWWWWC
  687     9     33      1     18     38    791    |WWWWWWWWWWWWWWWWWWWWW
  647    15     33      1     10     23    734  20+WWWWWWWW WWWWWWWWW
  715     6     47      1     22     24    815    |WWWWWWW WWWWWWWW WWWC
  777    17     68      0     16     24    902    |WW WWWWWW WWWWWWWW WWWWWC
  719    11     52      1     26     29    838    |WWWWWWW WWWW WWW WWWC
  699    11     50      0     21     22    803  21+WW WWWWWWWWWWWWW WWWWC
  707     9     54      0     19     20    809    |WWWWWWWWWWWWWWWWWWWC
  824     9     62      0     23     41    959    |WWWWWWW WWWWWWWWWW WWWWWWWCS
  665     4     39      4     10     26    688    |WWWWWWWWWWWWWWWWWW
----- ------ ------ ------ ------ ------ ------  22+-----------+-----------+-----------+-----------+-----------+-----------+-----------+-----------+
42531   724   2337     16   1351   2549  49508    0          400         800        1200        1600        2000        2400        2800        3200
```

FORTRAN IV COMPILER BUG - FORMAT STATEMENTS

Joyce Walton

The use of redundant repetition values in FORMAT statements for multiple record input can result in job termination at execution time with no diagnostic messages.

For example, the following code will fail:

```
          DIMENSION N(12)
          READ (5,2) N
      2   FORMAT( 4(15X, 3I5))
```

The following variation also fails:

```
      2   FORMAT( 4( 15X,3I5, / ))
```

However, either of the following is acceptable:

```
      2   FORMAT ( 15X,3I5 )

      2   FORMAT ( 15X, 3I5, / )
```

Note that this restriction applies only to input; output functions correctly with any of these.

THE CONSORTIUM

Joyce Walton

A group of 7094 users have formed a Consortium, and their negotiations with UTCC over the past two months have resulted in an exchange of letters of agreement, which offer the following guarantees:

- to the UTCC
  = coverage of the costs of the 7094 operation;
  = three months' notice before termination of the agreement.

- to the Consortium
  = as much computing as the installation can provide with no increase in costs, on an IOI basis for long jobs.

- to all 7094 users
  = no change in level of service;
  = continuation of the 7094 availability at least until December 1972, with six months' notice of termination after that date.

Any research user of the 7094 who would be interested in lowering his computing costs by joining the Consortium should get in touch with either Dr. A. W. Key of the Department of Physics or Dr. S. G. Whittington of the Department of Chemistry.

UTCC DIRECTORY

	ROOM	PHONE 928-
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Dr. John C. Wilson	SF105	6496
ASSISTANT DIRECTOR:		
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Mr. Alan Wickens	49 St. Geo.	6135
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Mr. Derry Cox	SF112	7092
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Mr. Sam Goldfarb	49 St. Geo.	3787
INTERACTIVE SYSTEMS AUTHORIZATION CLERK:		
Mrs. Cathy Pidcock	SF115A	8703
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Dr. Dave McNaughton	SF136	6281
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TERMINAL SUPERVISOR:		
Mr. Alan Jones	SF112	6220
USERS' SERVICES GROUP MANAGER:		
Mr. Robin Williams	SF128	2694
7094 MANAGER:		
Mrs. Joyce Walton	BT1207	7094
JOB STATUS QUERIES:		
SYSTEM/370		7373
7094		7094
Auxiliary Services		2988
INTERACTIVE TERMINAL SYSTEMS:		
System Status		6234
APL		7200
ATS		7100
CPS		6200

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 110/111
- provides General Purpose Job Stream and High Speed Job Stream services
- 2048K bytes of core
- 16 disk drives
- 1 drum
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 5 printers
- 4 card readers
- 2 card punches
- 6 remote terminals
- 1 paper tape reader

- OS/MVT with HASP

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems services
- 1536K bytes of core
- 8 disk drives
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 70 2741 typewriter terminals

- OS/MVT with CPS, ATS, and APL

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

UTCC AUXILIARY EQUIPMENT

- located in SF Room 107
- SYSTEM/360 Model 20 for unit record services
- CALCOMP Plotter
- card sorter

UNIVERSITY OF TORONTO
COMPUTER CENTRE
TORONTO, CANADA